IndianaMap Phase 1 –
GIS Benchmark and Gap Analysis of Local Level Framework Data

PROJECT LEADER: **Indiana Geographic Information Council, Inc.**

I EXECUTIVE SUMMARY

The Indiana Geographic Information Council, Inc. (IGIC) has received a grant from the Indiana Land Resources Council to implement Phase 1 of the *IndianaMAP*, a 10 month project to benchmark local-level Indiana GIS, analyze gaps in GIS data and information, use this information to plan for a reliable, consistent geographic information (GI) infrastructure, and broadly disseminate the information gained from the project. IGIC was created in 2000 as a not-for-profit (pending) statewide coordinating body to guide the sound development of geographic information systems and geographically related information technology for the state of Indiana. The *IndianaMAP* project will support this mission through the three complementary, integrated initiatives shown in Figure 1.

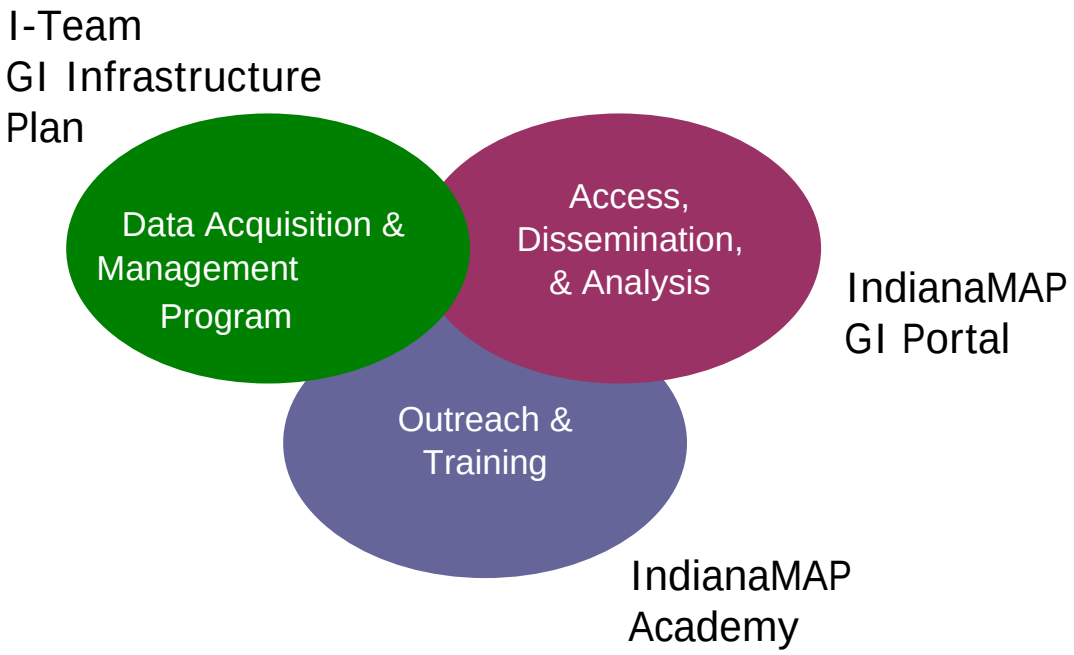

Figure 1. *IndianaMAP* Project

IndianaMap Phase 1 will begin the process by providing a statewide, locally-focused GI Infrastructure Plan, that will include benchmarking of local GIS activity, a gap analysis of framework (i.e., base map) data, and a plan for framework completion. Status maps linked to framework data information and contact information will be web-enabled, providing an interactive visual display and retrieval of local level GIS status and information on who is doing what with GIS. This will provide the first comprehensive level of access to local GI information through the IndianaMap portal. Outreach and training will consist of 12 regional seminars on the IndianaMap, high-profile exhibition at the 2003 Indiana GIS Conference, and a decision-makers breakfast. The project will be showcased nationally in concert with the Federal I-Team Initiative. The project will also be presented at Indiana meetings and conferences, and promoted through general media and marketing. IGIC will utilize its relationship with member and cooperating organizations to assure broad dissemination and high visibility for the project.

Ultimately, IGIC's vision for the IndianaMap is to: 1) have 100% statewide coverage of the framework based on minimum standards for use and inner-operability, 2) provide GI access, dissemination, and services to technical, management, and general public audiences, and 3) establish a strong outreach and training program on the IndianaMap to promote its use and assist in decision-making. The proposed IndianaMap Phase 1 represents a significant step forward to accomplish these goals by providing 1) benchmarking of GIS at the local level – statewide, 2) information for local decision-makers about GIS contacts and data availability, 3) business case in support of a statewide plan and infrastructure, and 4) continued track record for supporting Indiana statewide GIS.

II BACKGROUND

In May, 2002, the Indiana Geographic Information Council, Inc. (IGIC) began a detailed survey of Indiana local government GIS activities for the purposes of benchmarking GIS adoption, use, and framework (sometimes referred to as base map) data in the state. The survey was conducted by IGIC Data Sharing Committee volunteers through telephone contact with every county in Indiana, as well as many smaller units of government. IGIC has identified as mission-critical the need to utilize the survey results as web-based, map enabled data and information to visually communicate and actively promote interoperable/enterprise GIS on a statewide basis.

IGIC volunteers contacted local government officials and collected information including appropriate contact information, level of GIS use (if any), jurisdictional coverage, departmental application of GIS, hardware/software platforms, data acquisition methods, data sharing policies, and framework data information. There are seven categories of framework data as defined by the Federal Geographic Data Committee. These include the following: <insert with descriptions>

For each framework category, respondents were asked about data availability, scale, and costs. This information will benchmark Indiana GIS at the local level of government, be used to examine gaps in GIS coverage across the state, and be used for planning purposes to meet IGIC's goal for Indiana framework data – 100% coverage in 3 to 5 years of each of the framework categories (at a minimum 1:24,000 scale). IGIC is leading planning activities through an active I-Team process (see Appendix A for more information about I-Teams).

This proposal will enable IGIC to fully utilize the survey results by analyzing and publishing the survey data over the Internet in an easy to use, map based interface. This project will provide users the ability to examine information about specific locations throughout the state, access local contact information, and view maps showing where data exist (and equally important where they don't).

III DESCRIPTION OF THE PROJECT

Project Narrative

Whether talking about emergency management, economic development, land use, the environment, and much, much more, decision-makers at all levels field one question more than any other – *How does that affect me?* Geographic Information Systems (GIS), a computer mapping and analysis tool, has made that question easy to answer and the answers easy to understand. Most data used by government, industry and citizens have a spatial or geographic component. Consequently, GIS and geographic information significantly affect how we all do business. All levels of government invest millions of dollars in the production of digital geographic data specific to Indiana. Figure 2 shows the end-to-end process for production and use of geographic information and services. This process has many elements that can be grouped into three distinct phases:

Planning – collecting user needs and formulating a plan to address those needs
Production – acquiring/developing geographic data, products, and services that are responsive to validated user needs

Exploitation – providing the tools and resources that support the application of geographic products and services to meet the user's needs.

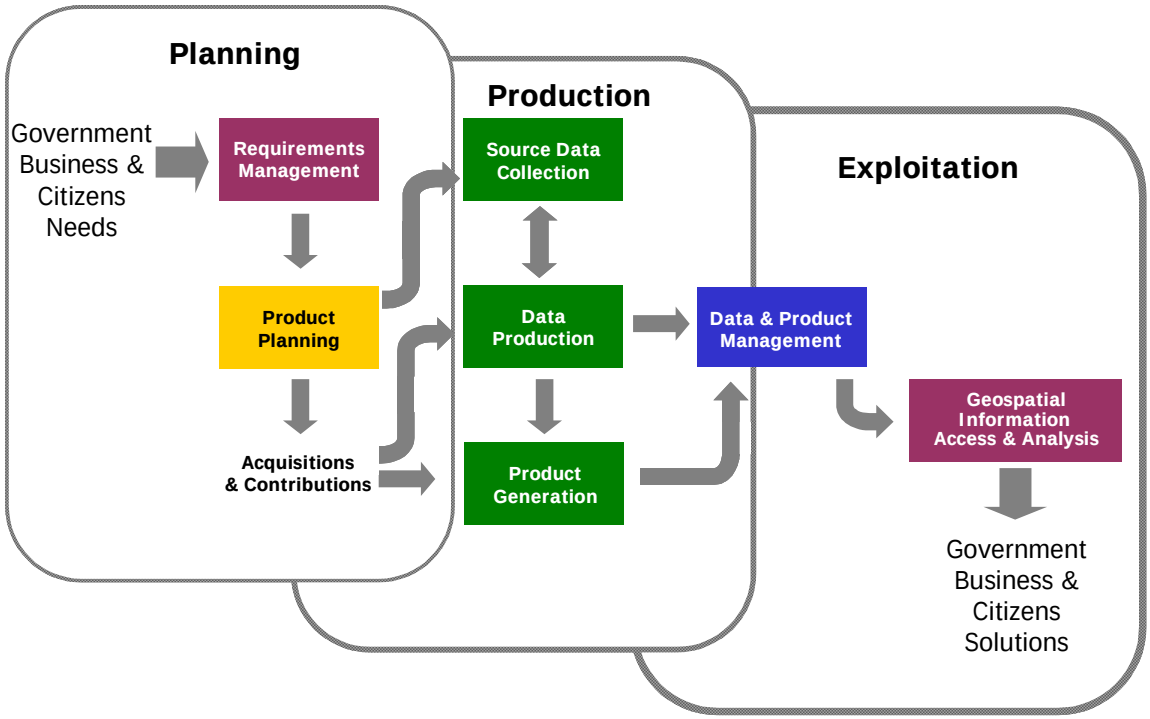

Figure 2. Geographic Information and Services Lifecycle

Historically, geographic data layers have been funded largely by individual agency initiatives with limited intergovernmental coordination. This process is ineffective and costly. Geographic data should be handled as a critical capital asset. In order to allocate the state's financial resources more efficiently and to avoid duplicative spending, the implementation process for Indiana's geographic information (GI) infrastructure needs to occur on a priority basis. Moreover, investment in these data is only leveraged when user organizations and individuals are aware of and have access to the data.

Many state and local government agencies have applied all or portions of this process to utilize GIS effectively for years. While the potential for beneficial use of GIS in state and local government is extensive, key process issues must be addressed from an enterprise perspective to ensure this is done comprehensively, effectively, and efficiently.

The goal of the IndianaMAP Phase 1 project is to address the geographic process issues in such a manner as to enable all sectors of Indiana government, businesses and citizens to effectively and efficiently utilize geographic information and services to enhance their business processes. The strategy is to address the geographic process from an enterprise perspective through the three IndianaMAP initiatives identified in Figure 1 and as described below.

A. I-Team Geographic Information (GI) Infrastructure Plan

The objective of the I-Team GI Infrastructure Plan (I-Team Plan) establishes a process for defining, implementing, and maintaining geographic information and services in Indiana and to recommend the framework implementation strategy. This initiative will directly address the Planning Phase shown in Figure 2. Based on recommendations provided by the Federal Office of Management and Budget (OMB) in Collecting Information in the Information Age, a statewide Implementation Team or 'I-Team' has been established to prepare the strategic plan for defining, developing and maintaining Indiana's geographic data infrastructure (see Appendix 2). IGIC and Indiana's I-Team have been recognized as a national leader for

GIS coordination, including being a recipient of the 2002 ESRI Special Achievement in GIS Award for building the institutional relationships for a successful statewide approach. By aligning Indiana's needs and resources under the I-Team concept, all levels of government and the private sector will have the opportunity to use their financial resources more efficiently, to migrate from existing legacy systems, to make use of existing resources, and to develop the business case for new and expanded public and private geospatial resources. Furthermore, because the I-Team Initiative addresses the major barriers to development of the framework through a coherent set of institutional and financial incentives, it will be easier for all levels of government and the private sector to collaborate in the building of the next generation of framework data.

The Indiana I-Team currently consists of the twenty-five members of IGIC plus additional entities as shown in Table 1. I-Team participation is open to all interested organizations and is currently being expanded to include additional academia and federal governmental agencies with Indiana interests, and the private sector.

Under the proposed project, the first component, and long-term direction for the IndianaMAP project will be provided through a comprehensive statewide benchmark study, gap analysis, and subsequent plan for production, acquisition, and management of key geographic framework information. The first version of this plan, known as Planning a Geographic Information Infrastructure (I-Team Plan), was produced in 2001 and is available from IGIC. That document provides a high level inventory for the Indiana framework and outlines a business case for the geographic information infrastructure. Through a strictly volunteer effort of IGIC's Data Sharing Committee, a local government benchmark survey is now being completed to gather the required information to take I-Team planning where it belongs – at the local level. The information collected will feed directly into the proposed IndianaMap Phase 1 project, resulting in the next version of the I-Team Plan. The I-Team integrates local, state and federal government, private, academic, and non-governmental interests and represents a process for building and maintaining the GI infrastructure. Under this initiative the I-Team will work collaboratively to create Indiana's I-Team Plan.

IGIC BOARD MEMBERS

County	
Dax Denton, Legislative Associate Association of Indiana Counties	Larry Stout, Hamilton County GIS Manager Hamilton County Info. System Services Dept.
Municipality	
Mark Bucherl, Director of Communications Indiana Association of Cities and Towns	Mike Machlen, City of Elkhart City of Elkhart Public Works & Utilities
State	
Roger Koelpin, State GIS Coordinator Information Technology Oversight Commission	Irvin Goldblatt, IDEM GIS Coordinator Indiana Department of Environmental Management
Federal	
Jane Hardisty, NRCS State Conservationist USDA-Natural Resources Conservation Service	Charles Hickman, NMP Indiana Liaison U.S. Geological Survey
Not-for-Profit	
Bob Weaver, President Hoosier Heartland / Johnson Co. IASWCD, Inc.	Tim Sutherland Grand Cal Task Force (GCTF) / IU Northwest
Commercial GIS Service Provider	
Eric Torok, GIS Director The Schneider Corporation	Jerry Giger, Director, GIS Data Publishing Analytical Surveys Inc.
Regional GIS Consortia	
Becky McKinley, Co-Chair NW Indiana GIS Forum	David Mockert, GIS Administrator Marion County GIS / City of Indianapolis
University	
John Hill, Assistant Director Indiana University - Indiana Geological Survey	Karen Frederickson, IT Director The Polis Center at IUPUI
Surveyor	
Dan Pusey, ISPLS Indiana Society of Professional Land Surveyors	Jay Poe, Huntington County Surveyor Association of County Land Surveyors
Regional Planning Commission	
Lisa Gehlhausen Indiana 15 Regional Planning Commission	
Private Industry	
Michael Baise Indiana Farm Bureau, Inc.	Lou Zickler, Executive Board Association of Indiana
Utilities	
John Tanger Northern IN Public Service Company (NIPSCO)	Greg Justis Cinergy
At Large	
Michael Andrews Indiana Dept of Transportation	Jill Saligoe-Simmel Watershed Research

Table 1. Indiana's I-Team Core is comprised of 25 IGIC Board Members

B. *IndianaMAP* Geospatial Portal

Today – The Proposed IndianaMap Phase 1

The second component of *IndianaMAP* is the web-based geographic information (GI) portal. In Phase 1, information from the local government survey will be used to create status maps and graphics depicting where activity is present, and where gaps exist. Mapped information will be linked to contact information and will be web-enabled, providing an interactive, dynamic display and retrieval of local level GIS status and information on who is doing what with GIS. This will provide the first comprehensive level of access to local GI information through the IndianaMap portal. The *IndianaMAP* Geospatial Portal will be implemented in an easily accessible web-based infrastructure, making it a widely available resource to Indiana communities of interest.

IndianaMap Phase 1 will provide an interim solution to access and availability of framework data at the local level by identifying where the framework exists, qualities of that data, and pointers to the data through contact information. IndianaMap Phase 1 will also provide the information necessary to build a strong case for the completion of Indiana's framework, the benchmark data required for planning and future evaluation, and a dynamic interface for quickly communicating that information.

The Future

Ultimately, the portal will provide state and local government decision makers, academia, and the general public access to and dissemination of the geographic framework data, other data, and metadata. The framework datasets identified in the I-Team GI Infrastructure Plan will be integrated within a database management system, utilizing established data management and dissemination framework (based on the Data Clearinghouse Needs Assessment and System Design funded by the Indiana Land Resources Council). As appropriate, clearinghouse technologies and distribution standards established by the federal government and the Open GIS Consortium (OGC) will be implemented, allowing users to draw upon a single interface for data search and acquisition.

In the future, the portal will also provide satellite services for analysis of user supplied information in the context of the geographic framework data. The concept of satellite GI services, with accompanying secure levels of access, audience-specific training, and custom programs is depicted in Figure 3. The *IndianaMAP* portal will be implemented by IGIC and pointed to from pages within the AccessIndiana portal.

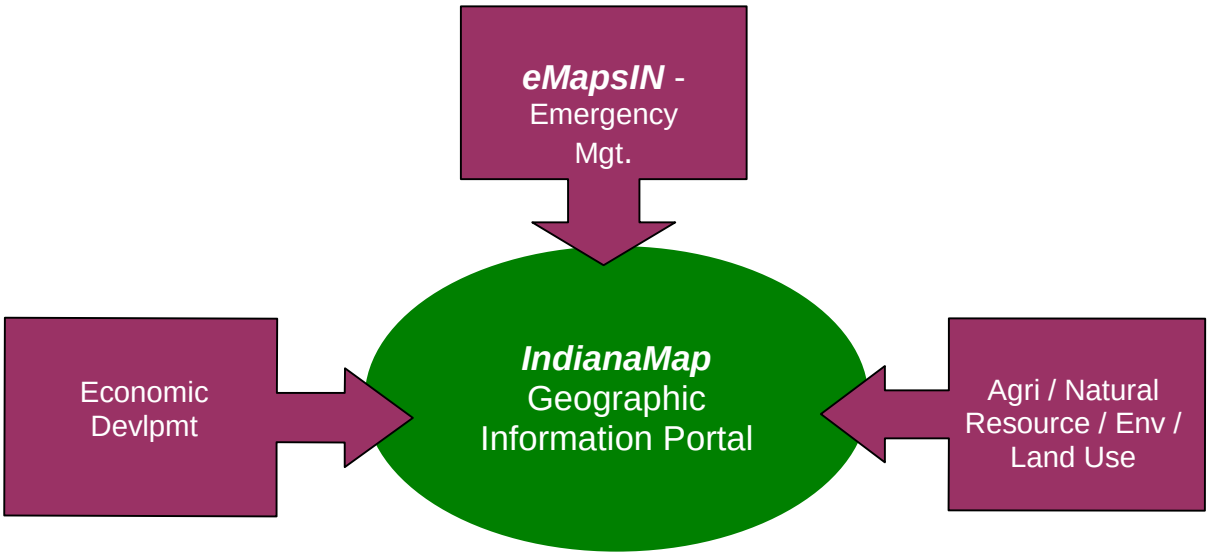

Figure 3. Example of satellite services complementing *IndianaMap*

The Portal interface, customized to address the different needs of the GIS community, decision-makers, and the needs of Indiana citizens, will be designed and implemented to provide meaningful access to the available data services. Advanced GIS users will be able to query, identify, and stream (or download) geospatial datasets directly into professional-level GIS applications for integration with their own data products. Users not requiring the advanced technology of professional GIS applications can search, identify, and display geospatial data directly to the desktop through a thin-client browser interface such as Internet Explorer or Netscape. Additionally, the option exists for *IndianaMAP* services to be directly integrated within the *AccessIndiana* portal, providing value added location-based services and resources previously unavailable on *AccessIndiana*.

C. IndianaMAP Academy

The *IndianaMAP* Academy is the third component of the project, and will be activated in October 2002 to provide outreach and training on the IndianaMap program. Initially, outreach will focus on marketing the project and I-Team Plan, orientation to the information contained in the Phase 1 Benchmark Study, and dissemination of IGIC standards and recommendations for framework use and integration. The proposed Phase 1 project will support twelve regional ½ day seminars geared to three target audiences: emergency management, agriculture/natural resources/environment/land use, and economic development. Additionally, the project will receive a high-profile exhibition at the 2003 Indiana GIS Conference, a decision-makers breakfast, and showcased nationally at appropriate forums. As part of the project, Indiana will participate in at least one national forum addressing federal funding solutions for state and local government to support I-Team framework development.

The project will be presented at Indiana meetings and conferences, and promoted through general media and marketing. IGIC will utilize its relationship with I-Team cooperating organizations such as ILRC, AIC, IACT, IASWCD, IDOC, SEMA and C-TASC to assure broad dissemination and high visibility for the project.

Implementation Approach

The most innovative aspect of this project is its organizational structure. Through the I-Team concept this project will be performed by active collaboration of many government entities at the Federal, state, and local levels. This is shown in Appendix A. In addition, members of Indiana's business community and academia will actively participate. It is estimated that more than 3,000 volunteer hours will be contributed to this project through I-Team member collaboration. In order for this to work most efficiently the project will be organized under an integrated team approach. The teams are workgroups with representation from across the diverse I-Team membership that will be created to develop specific parts of the overall project plan.

The project will utilize staff from the IUPUI Center for Earth and Environmental Sciences – Graphics Lab, volunteers from IGIC's I-Team Workgroups and Committees, and in-kind staff contribution from the City of Indianapolis GIS Department. The project will also utilize GIS response information collected by the Indiana Association of Cities and Towns (IACT) technology survey completed earlier this summer.

Project Management. Overall project management is the responsibility of the Indiana Geographic Information Council. IGIC will provide administrative support through an I-Team Coordinator including meeting coordination, collection of project status, preparation of status reports, and preparation of technical reports and the I-Team Report for the Governor and CIO.

Long-range Planning. A key goal for the *IndianaMAP* project is to establish a needs-based planning process and organizational structure to develop and maintain the long-range, comprehensive plan for production, acquisition, and management of common geographic data and user services for the state. The I-Team plan will be continually maintained as a "living plan" that reflects new and evolving statewide needs, priorities, and missions as well as major geospatial technology advancements. A key objective of this project is to institute a responsive planning process that will be utilized effectively for the long-term.

IndianaMAP Phase 1 gap analysis will identify data needs and result in the publication and adoption of specific framework data models of statewide interest, as identified and detailed in the I-Team Plan. This will promote data interoperability among the framework data themes and across organizational lines. It will also set a long-term direction for consistent data collection among the state's framework data partners. Furthermore, the I-Team process will facilitate ongoing community participation in the evaluation and adoption of relevant standards. Finally, *IndianaMAP* and the I-Team process will establish the practices and techniques that will be used as the building blocks for additional data themes.

Also important is the long-range services aspect of *IndianaMAP*. Agency needs for application of geographic data will be identified through the ongoing planning process both during and after this project is complete. Based on priority, these needs will drive the requirement for new services capability in either the *IndianaMAP* portal or agency-specific GIS environments (Refer to Appendix B: Driving Issues).

Appendix A: What is an I-Team?

Whether talking about land use, emergency management, economic development, the environment, and much, much more, decision-makers at all levels field one question more than any other – *How does that affect me?* Geographic Information Systems (GIS), a computer mapping and analysis tool, has made that question easy to answer and the answers easy to understand.

GIS is a tool used in data collection, storage, mapping, display and analysis. While GIS is the tool that powers the system, a Geographic Information (GI) Infrastructure is the fuel that powers the system. Cooperating with local, state and federal government, public and private organizations, and universities across the state, the Indiana Geographic Information Council, Inc. is leading the planning of Indiana's GI Infrastructure. The effort, referred to as Indiana's I-Team Initiative, will develop Indiana's GIS framework, or base map, use common data standards, and provide mechanisms for easy data access (Figure 1). The results of these efforts will help to provide integrated information for analysis of issues and decision-making at federal, state, local, and tribal levels of government. Further it will provide a common frame of reference for communicating information and concepts of complex issues to citizens.

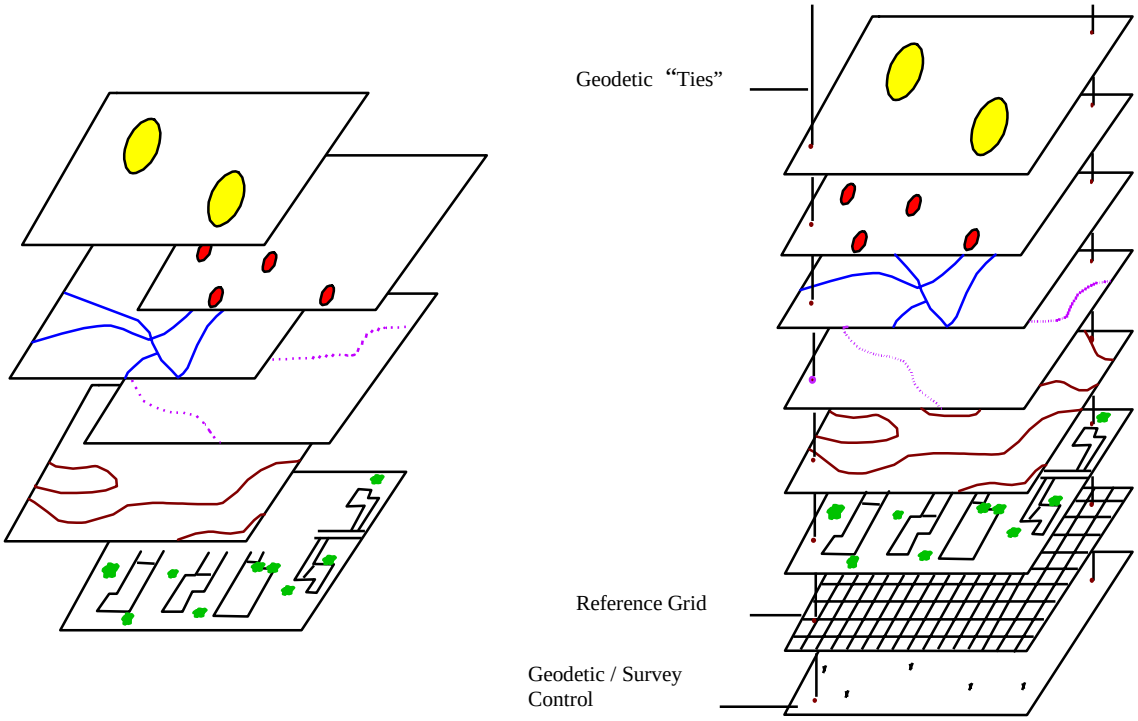

Figure 1. Indiana's I-Team will develop a GI Infrastructure where map layers "line up". Without a continuous coordinate system or appropriate control the layers will not overlay correctly. With a continuous coordinate system and appropriate control the layers will overlay correctly.

I-Teams are locally formed, interdependent partnerships of federal, state, local, and tribal authorities; academia; and the private sector. I-Teams implement state and regional portions of the NSDI in their own best interests. What is unique about I-Teams is that they bring all relevant and affected providers and users of data together around the same table, shifting the balance of power for decision making downward from the federal to the state and local level. I-Teams are voluntary, open, flexible, and adaptive collaborations for sharing capital planning, building, use, and financing of spatial data. They align and optimize dependencies, helping to develop standards and implement specifications by consensus among I-Teams.

The I-Team Initiative addresses the institutional and financial barriers to development of the National Spatial Data Infrastructure at federal, state and local levels. It aims to offer a coherent set of institutional and financial incentives to make it easier for all levels of government and the private sector to collaborate

in the building of the next generation of framework data. With seven layers of framework for the common base, the GI Infrastructure adheres to the principle of "build once, use many times" (figure 2). By aligning participant needs and resources, Indiana's I-Team Initiative will help all levels of government and the private sector to save money, migrate from existing legacy systems, make better user of existing resources, and develop the business case for additional public and private resources.

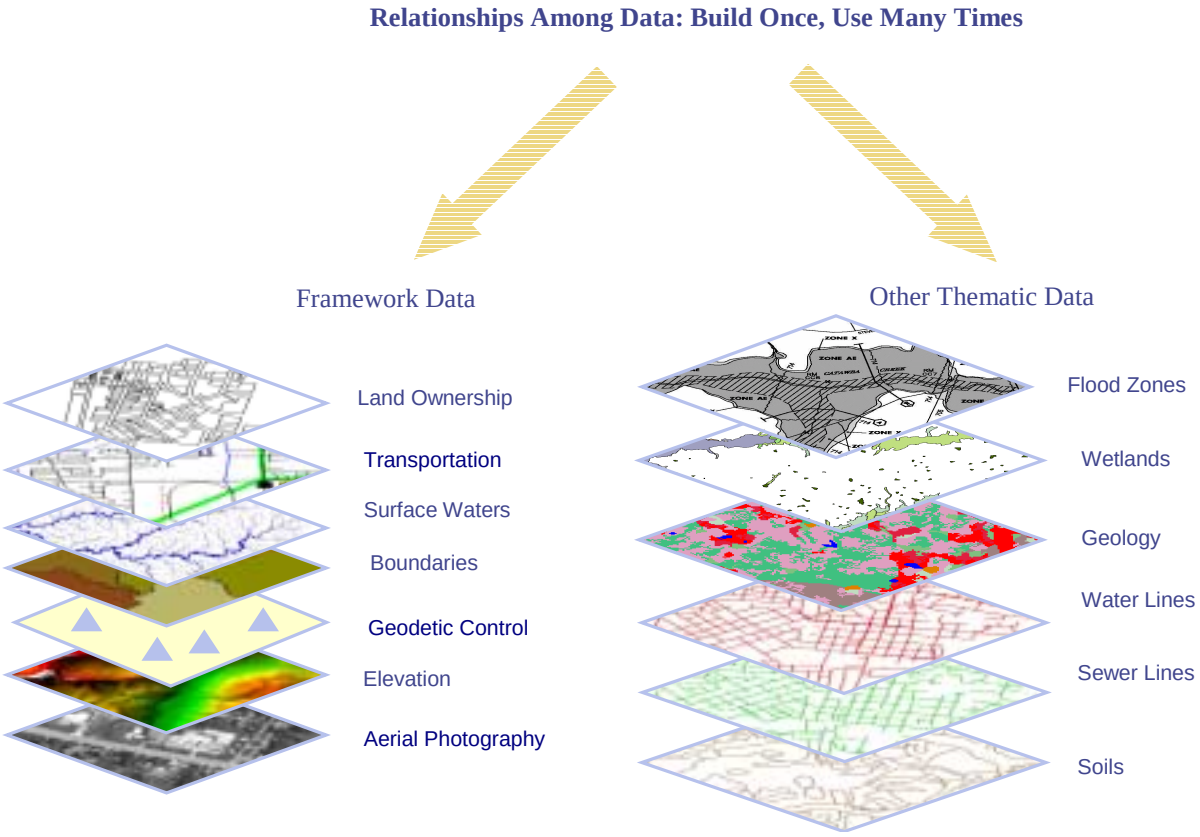

Figure 2. Everything fits together when other data are built on top of a common base of framework data.

Who is Involved?
I-Team Organizational Structure

As the official statewide GIS coordinating body for Indiana, the Indiana Geographic Information Council, Inc. (IGIC) comprises the "core" of Indiana's I-Team, providing overall direction and leadership for the initiative. IGIC is comprised of a diverse group of professionals representing 12 major stakeholder sectors in Indiana. Attached is a listing of the IGIC Board of Directors and their affiliations. In addition to leading the I-Team efforts, IGIC Standing Committees include Data Sharing, Standards and Recommendations, Education and Outreach, Networking, Web Development, and Annual Conference.

Indiana's I-Team is organized into variety of workgroups addressing driving issues, policy issues, framework data needs, and financial solutions. In addition to the IGIC Board of Directors, the following organizations and individuals are involved:

<u>Federal</u>
Charley Hickman, Indiana Liaison, National Mapping Division, US Geological Survey
Carol Brandt, Bureau of Transportation Statistics, Federal Highway Administration
Steve Lewis, Bureau of Transportation Statistics, Federal Highway Administration
Jim Denoncour, Hoosier National Forest
Scott Deuel, US Census Bureau

Gail Krmenec, US Census Bureau
Ron Lauster, State Resource Conservationist, Natural Resources Conservation Service
Ronald T. Matzner, I-Team Coordinator, Federal Geographic Data Committee
Nancy Backer, US Geological Survey
Kris Soonpaa, Natural Resources Conservation Service

State
Pat Ralston, Director, State Emergency Management Agency
Clifford Ong, Executive Director, Counter-Terrorism and Security Council
David Ford, State Senator, State of Indiana
Joe Tutterrow, Executive Director, Indiana Land Resources Council
Dan Stickney, Budget Analyst, State Budget Agency
Jeff Sewell, Indiana Department of Environmental Management
Bob Wilkinson, Indiana Department of Natural Resources, Division of Water
Linda Schmidt, Indiana Department of Environmental Management, Office of Water Quality
Jennifer Kurtz, Indiana Department of Commerce
David Glenn, Indiana Department of Transportation
Larry Cummings, Intelenet Commission
James Lewis, IODA
Marty Jackson, Director of IT, State Emergency Management Agency
Maureen Bard, Legislative Services Agency
Mark Stratton

Local Government
Jack Walker, GIS Manager, City of Mishawaka
Roger Lehman,
John P. Thomas, GIS Manager, City of Lafayette
Mark Bradley, Indianapolis GIS
Jim Stout, IMAGIS Consortium
Thomas Greene, Lieutenant, Indianapolis Police Dept

Academia , Private Sector, and Professional and Community-based Organizations
Philip Worrall, Innovative Mapping, Inc.
Christa Martin Jones, Executive Director, Indiana Association of Soil and Water Conservation Districts
Josh Goode, Executive Director, Upper White River Watershed Alliance
Gary Kent, Surveyor, The Schneider Corporation
Indiana Academy of Sciences
Cresswell A Hizer
John Steinmetz, Director, Indiana Geological Survey
Boudewijn H. W. van Gelder, State Geodetic Advisor, Purdue University
Jim Emery, Innovative Mapping, Inc.
Jim Sparks, Innovative Mapping, Inc.
Ken Brennan, The Schneider Corporation
Doug Marvel, Spatial Marvels, Inc.
Joyce West, The Sidwell Company
Brian Harvey, Ball State University
Jeff Corns, The Schneider Corporation
Jerry King, IPALCO
Frank Kelly, IPALCO
Anna Radue, Indiana University

Organizing Themes for I-Team Workgroups

Driving Issues
Homeland Security / Emergency Management
Agriculture / Natural Resources / Environment / Land Use
Economic Development

Policy Issues
Financial Alignment
Data Access and Security
Data Stewardship
Data Distribution

Framework Data

1. Geodetic Control - reference system of monumented points and GPS control stations
2. Aerial Photography (Orthoimagery) - georeferenced image or remotely sensed data
3. Elevation - elevations of land surfaces and the depths below water surfaces
4. Transportation - includes roads, trails, railroads, waterways, airports and ports, bridges and tunnels
5. Surface Water (Hydrography) - includes surface water features such as lakes, ponds, rivers, streams, canals, and shorelines
6. Boundaries (Governmental Units) - units of government includes state, counties, incorporated places, legal civil divisions, Am. Indiana reservations
7. Land Ownership (Cadastral Information) - past, current and future rights and interests in real property, includes surveys, legal descriptions, parcels, cadastral reference systems e.g. PLSS, and publicly administered parcels e.g. military/state parks/etc.

- Other Priority Data
- Soils
- Geology
- Critical Infrastructure

Appendix B: Driving Issues / Required Data

The I-Team, working with the agencies they represent, identified many of the State's most serious issues. The I-Team then determined which data themes are required to successfully address each issue, summarized in the following table.

While the table is presented in no specific order, IGIC has identified the top three driving issues for GIS in Indiana:
Homeland Security / Emergency Management
Agriculture / Natural Resources / Environment / Land Use
Economic Development

Priority Data Layers / **Indiana Issues**	Geodetic Control	Digital Ortho-Imagery	Elevation	Transportation	Hydrography	Boundaries	Cadastral	Demographics	Wetlands	Geology	Wildlife habitat	Weather / Climate	Ground Cover	Land Use	Soils	Telecommunications	Critical facilities/Infrastructure	Environmental
Homeland Security	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X
Economic Development	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Education / Enrollment	X			X		X	X	X						X		X		X
E-gov Service Delivery	X	X	X	X	X	X	X	X								X		
Livable Communities /Quality Growth	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Rural Economies	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Septic Systems/Combined Sewer Overflows	X	X	X		X	X	X		X	X				X				
Agriculture/Farmland Preservation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
Environmental Protection	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
Law Enforcement	X	X	X	X		X	X	X								X	X	
Brownfields	X	X	X	X	X	X	X		X	X			X	X	X	X	X	X
Traffic/Transportation	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Redistricting / Census	X	X		X		X	X	X								X	X	
Epidemiology/ Health Care	X	X		X		X	X	X								X	X	X
Social Services	X	X		X		X	X	X								X	X	